



Distribution and habitat of selected carnivores (Herpestidae, Mustelidae, Viverridae) in the rainforests of southeastern Nigeria

By F. M. ANGELICI, L. LUISELLI, and E. POLITANO

*Italian Foundation of Vertebrate Zoology, Rome, and Environmental Department ENI (Aquaterr),
S. Lorenzo in Campo, Pesaro, Italy*

Receipt of Ms. 15. 09. 1998

Acceptance of Ms. 14. 01. 1999

Key words: Herpestidae, Mustelidae, Viverridae, habitat, Nigeria

Nearly all the small – to medium – sized carnivorous mammals (Herpestidae, Mustelidae, and Viverridae) living in West Africa, including southeastern Nigeria, are threatened by uncontrolled hunting activities (POLITANO 1997). This continued hunting activity has provoked a severe effect on the status and population abundance of several species, including those which are especially relevant in the biogeographic or conservation point of view. A recent field investigation in the eastern Niger Delta (Port Harcourt, Rivers State, Nigeria, see POLITANO 1997) has permitted to obtain records for twelve species. Another species (*Genetta thierryi*), a typical inhabitant of Guinea savannas (KINGDON 1997), may possibly be present in the study area, but no actual data about its presence have been collected (POLITANO 1997).

During recent years, an increased interest has arisen on the distribution and status of small- and medium-sized carnivores of southeastern Nigeria (HEARD and VAN ROMPAEY 1990; POWELL 1997; SINGH et al. 1995). In this study we therefore report novel data on the status of several selected species of Herpestidae, Mustelidae, and Viverridae, and on their distribution and the habitat frequented.

The research study was conducted during five field expeditions (for a total of 213 days in the field) between September 1996 and May 1998 in four regions of southeastern Nigeria (see Fig. 1): eastern Niger Delta (Port Harcourt region, Rivers State, approx. 04°45' N, 07°01' E), region of Aba (Abia State, 04°47' N, 07°35' E), region of Eket (Akwa-Ibom State, 04°50' N, 07°59' E), and region of Calabar (Cross River State, 04°48' N, 08°21' E). These areas, which are heavily populated with hundreds of villages interspersed by patches of forests and cultivated lands, are especially important for the economy of Nigeria because of the extensive oil extraction and liquefied natural gas transmission installations. The forest patches may be dryland or of the swamp rainforest type. Mangrove forests (*Avicennia* spp., *Rhizophora racemosa*) are the dominant types of vegetation in the areas of the fluvial systems influenced by salt-water or brackish-water. The climate of the study regions is tropical sub-Saharan, with well-marked dry and wet seasons and relatively little monthly fluctuations in maximum and minimum temperatures (GRIFFITHS 1972).

Data given here were collected by means of the following methods: (i) specimens shot and trapped by hunters accompanied by the authors; (ii) specimens examined in small village markets of local tribes (for the methodology employed, cf. AKANI et al. 1998); (iii) field observations performed by us during the expeditions for assessing the environmental impact of the “LNG Natural Gas Liquefied and Transmission System” by the company

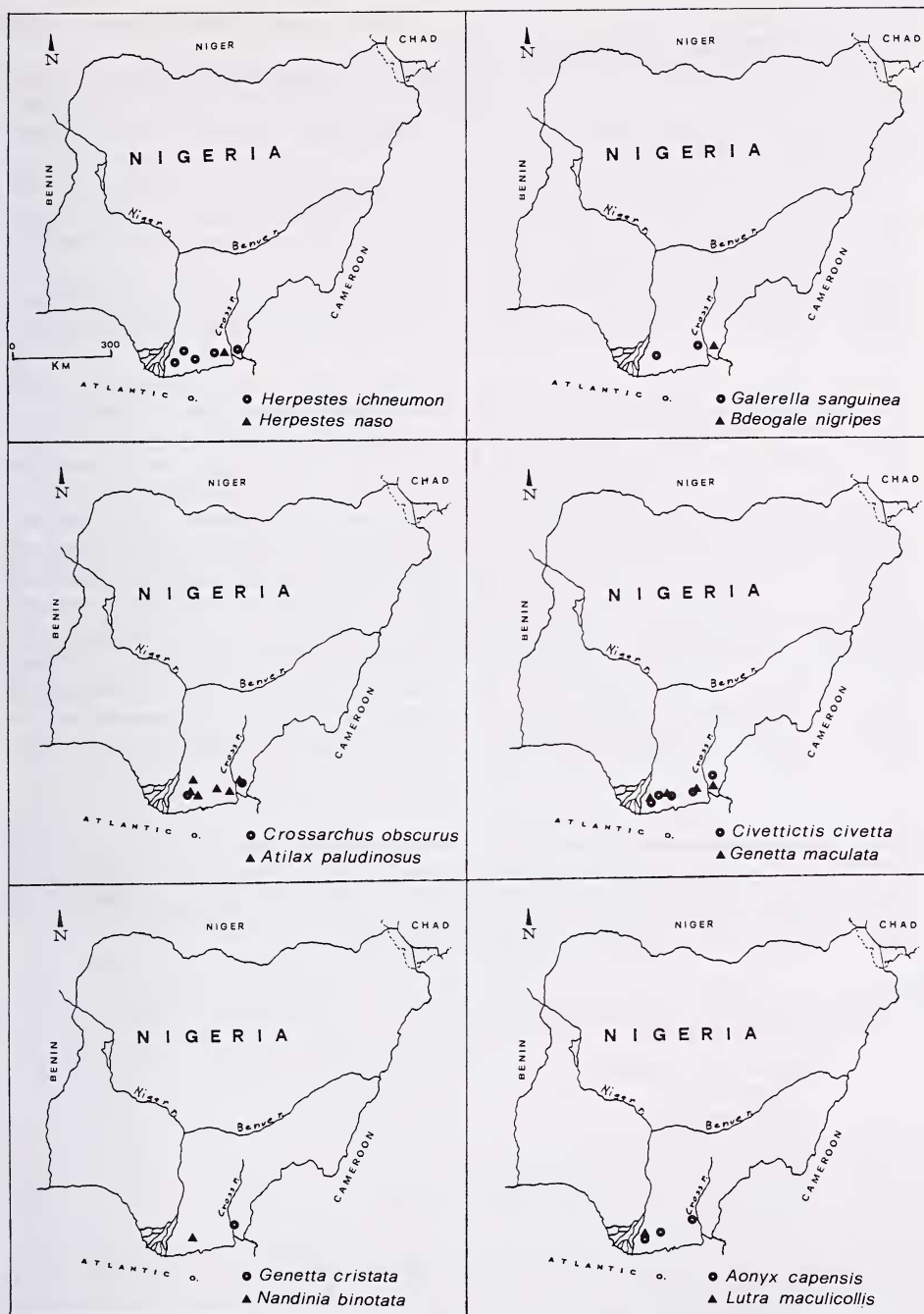


Fig. 1. Map of Nigeria, showing the distribution records relative to the various species studied.

"T.S.K.J. Nigeria Ltd." (POLITANO 1997), and (iv) skulls, remains, tracks, and other signs of the presence of the various species in the field.

Systematics of several taxa (e.g. those belonging to the genus *Genetta*) is still far from being well understood. Thus, for practical reasons, we followed WOZENCRAFT's (1993) indications, apart from the fact that we recognize as a valid species *Genetta cristata* (ROSEVEAR 1974; CRAWFORD-CABRAL 1981).

We subdivided the available habitat types into seven categories: (1) primary dryland forest, (2) secondary dryland forest, (3) former cultivations recolonized by bushy vegetation ("bush"), (4) swamp-forest, (5) mangroves, (6) farmlands and cultivated lands, and (7) aquatic environment (river banks, lakes, creeks, estuarine habitat, etc).

In total, we recorded 122 carnivore specimens. *Herpestes ichneumon*, *Atilax paludinosus*, *Civettictis civetta*, and *Genetta maculata* were the more frequently encountered taxa (Tab. 1).

The habitat of observation of each carnivore specimen recorded during the present study is presented in table 1. Pooling all the studied species, the higher amount of observation (30.3 % of the total, n = 122) was done in habitat (3), but many observations were done even in habitat (6) (22.1 %) and in habitat (2) (18 %). Conversely, only a few observations were done in all the other habitat categories. Records of distribution relative to the study species are presented in figure 1. With regard to *H. ichneumon*, it is somewhat surprising that this species was said to be a newly reported taxon for the Niger Delta by POWELL (1997), since it was discovered in bush-meat markets of Imo and Rivers States by OJONUGWA (1986). Indeed, our data indicate that *H. ichneumon* is one of the most commonly hunted Herpestidae by Niger Delta tribes. *Herpestes naso* was recorded west of Cross River, thus confirming POWELL (1997). *Galerella sanguinea*, previously recorded in northern and drier sites (HAPPOLD 1987), was shown to have penetrated in southern-more sites within the Niger Delta into wetter areas. *Bdeogale nigripes* was recorded only east of Cross River, but we cannot exclude that it is also present west of this river. *Cross-*

Table 1. Numbers of specimens observed and their relative habitat of observation, of several species of Herpestidae, Viverridae, and Mustelidae found in the study regions of southeastern Nigeria. Habitat types: (1) primary rainforest, (2) secondary rainforest, (3) former cultivations recolonized by bushy vegetation ("bush"), (4) swamp-forest, (5) mangroves, (6) farmlands and cultivated lands, and (7) aquatic environment (river banks, lakes, creeks, estuarine habitat).

Species	(1)	(2)	(3)	(4)	(5)	(6)	(7)
HERPESTIDAE							
<i>Herpestes ichneumon</i>		4	13			12	
<i>Herpestes naso</i>						1	
<i>Galerella sanguinea</i>		1	2			2	
<i>Bdeogale nigripes</i>	1						
<i>Crossarchus obscurus</i>	1	1					
<i>Atilax paludinosus</i>		2		18			9
VIVERRIDAE							
<i>Civettictis civetta</i>		6	14			7	
<i>Genetta maculata</i>	3	7	8			4	
<i>Genetta cristata</i>		1					
<i>Nandinia binotata</i>						1	
MUSTELIDAE							
<i>Aonyx capensis</i>							3
<i>Lutra maculicollis</i>							1

archus obscurus and *A. paludinosus* are widespread throughout the study area but the former is probably rarer. The same is true for *C. civetta* and *G. maculata*, which are widespread throughout the study area. With respect to *G. cristata*, possibly the most important viverrid species in south-eastern Nigeria because of its rarity and unknown biology (cf. HEARD and VAN ROMPAEY 1990), we were able to collect only one recent record from a bush-meat market in Itu (Cross River State). The hunter collected this specimen from a secondary forest patch situated in the surroundings of Itu, whereas HEARD and VAN ROMPAEY (1990) recorded this species from other areas of Cross River State, practically contiguous to the our own (e.g. Akampka, Oban, etc). In any case, POWELL (1997) recorded it even from the west side of this river. The status of this species is still unknown, because the problems of correct identification of various species of the genus *Genetta* by local people (including experienced hunters) causes strong problems in obtaining a reliable data-set (ROSEVEAR 1974; SCHLAWA 1981; HAPPOLD 1987; WOZENCRAFT 1993; KINGDON 1997).

Nandinia binotata is widespread in the study area (HAPPOLD 1987; KINGDON 1997; STUART and STUART 1997), but we recorded it just once during our surveys. Probably this rarity in our records depended on its arboreal habits, thus making this species rarely prey to human hunters; in fact, it is rarely captured by ground traps. In agreement with POWELL (1997), we confirmed the presence of *Aonyx capensis* and *Lutra maculicollis* for the study region. Considering the wide extension of the fluvial systems, creeks, and water bodies, we are led to believe that the apparent rarity of the otter species is in fact exaggerated, given the extremely elusive habits of these semi-aquatic carnivores. Otters are certainly present along the Upper Orashi River Course (at least from the village Elem-Sangama) and in other freshwater river tracts characterized by rainforest patches along the banks.

Our surveys demonstrated that there is still a remarkable diversity of small- and medium-sized carnivores in southeastern Nigeria, despite the strong alteration of the natural environment of this African region. The fact that many records were relative to bushy and cultivated lands suggests that these species are now well adapted to the environments modified by humans. There was a lack of data from mangrove forests. It is likely that this depends on the fact that this habitat type is very unfavourable to these animals. This habitat is deficient in available prey type to support stable populations of carnivores. For instance, frogs and toads, which are components of the diet of several carnivores (e.g. *A. paludinosus*, ROSEVEAR 1974), are nearly completely absent from brackish water river tracts where mangroves grow up (POLITANO 1997).

It is suggested that Cross River is a main barrier for many animal species, including mammals (HAPPOLD 1987; KINGDON 1989, 1997). However, this is not likely to be true for medium-sized carnivores, this being demonstrated by the recent records relative to several species west of the Cross River by POWELL (1997) and the present study.

Acknowledgements

We are indebted to the companies 'T.S.K.J. Nigeria Ltd.' (Port Harcourt and Lagos), 'Ecosystem s.r.l.' (Bari), 'Aquatec s.p.a.' (San Lorenzo in Campo), and 'Amertex Oil and Gas Ltd.' (Lagos) for supporting parts of our research in Nigeria. Special thanks go to P. M. AKANIWOH for having indicated some remarkable sites for observing carnivore tracks and signs. Several hunters provided us with original records on their trapped animals. Finally, we thank particularly Dr. E. E. NYONG (Governor of Cross River State), and Dr. E. M. BOCO (Chief of Calabar) for providing security assistance. Two anonymous referees considerably improved an earlier draft of the manuscript.

References

- AKANI, G. C.; LUISELLI, L.; ANGELICI, F. M.; POLITANO, E. (1998): Bushmen and herpetofauna: Notes on amphibians and reptiles traded in bush-meat markets of local people in the Niger Delta (Port Harcourt, Rivers State, Nigeria). *Anthropozoologica* **26** (in press).
- CRAWFORD-CABRAL, J. (1981): Análise de dados craniométricos no género *Genetta* G. Cuvier (Carnivora, Viverridae). *Memórias da Junta de Investigações Científicas do Ultramar Centro de Zoologia*, Lisbon **66**, 1–329.
- GRIFFITHS, J. F. (1972): *Climates of Africa*. New York: Elsevier Publ.
- HAPPOLD, D. C. D. (1987): *The Mammals of Nigeria*. Oxford: Clarendon Press.
- HEARD, S.; VAN ROMPAEY, H. (1990): Rediscovery of the crested genet. *Mustelid and Viverrid Conservation* **3**, 1–4.
- KINGDON, J. (1989): *Island Africa. The Evolution of Africa's Rare Animals and Plants*. Princeton: Univ. Press.
- KINGDON, J. (1997): *The Kingdon Field Guide to African Mammals*. London: Academic Press.
- OJONUGWA, O. S. (1986): A survey of wildlife in bushmeat markets in Rivers and Imo State, Nigeria. B. Sc. thesis Rivers State University, Port Harcourt, Nigeria.
- POLITANO, E., ed. (1997): *Environmental impact assessment of the LNG transport system on the fauna of the Niger Delta*. S. Lorenzo in Campo: Aquater Press.
- POWELL, C. B. (1997): Discoveries and priorities for mammals in the freshwater forests of the Niger Delta. *Oryx* **31**, 83–85.
- ROSEVEAR, D. R. (1974): *The Carnivores of West Africa*. London: British Mus. (Nat. Hist.).
- SCHLAWÉ, L. (1981): Material, Fundort, Text- und Bildquellen als Grundlagen für eine Artenliste zur Revision der Gattung *Genetta* G. Cuvier, 1816 (Mammalia, Carnivora, Viverridae). *Zool. Abh. Staatl. Mus. Tierkn. Dresden* **37**, 85–182.
- STUART, C.; STUART, T. (1997): *Field Guide to the Larger Mammals of Africa*. Cape Town: Struik Publ.
- WOZENCRAFT, W. C. (1993): Order Carnivora. In: *Mammal Species of the World. A Taxonomic and Geographic Reference* (sec. ed.). Ed. by D. E. WILSON and D. A. M. REEDER. Washington, London: Smithsonian Institution Press. Pp. 279–348.

Authors' addresses: Dr. FRANCESCO M. ANGELICI, Ph. D., F.I.Z.V., Via Cleonia 30, I-00152 Roma, Italy; Dr. LUCA LUISELLI, F.I.Z.V., Via Olona 7, I-00198 Roma, Italy [e-mail: luiselli@earthling.net]; Ing. Dr. EDOARDO POLITANO, Environmental Department, ENI, Aquater S. p. A., Via Miralbello 53, I-61047 S. Lorenzo in Campo (Pesaro), Italy